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EMERGENCY ENTOMOLOGICAL SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE.

Reporting cooperation between Federal, State and Station

Entomologists and other Agencies.

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CONTENTS.

A NEW SECTION OF THE BUREAU OF ENTOMOLOGY

FOR WORK ON STORED FOOD INSECTS.

War conditions greatly emphasize the importance of the control of insects damaging stored grain and other stored foods. In Russia the leading entomologists were called in conference on the subject many months ago. In this emergency it has been decided to strengthen the work of the Bureau of Entomology in this direction by establishing a distinct section or branch for the especial handling of this important problem.

Work on insects of this character has hitherto been successfully prosecuted by Doctor Chittenden, in addition to his work on insects affecting truck crops which in itself is a vast field of enormous importance at the present time and which will now practically take his full attention. The Secretary of Agriculture has appointed Dr. E.A.Back to the new position

"Entomologist in Charge, Stored Product Insect Investigations". Doctor Back will proceed to the field at once and begin an investigation of grain storing methods.

Doctor Chittenden will, in addition to his other duties, continue for a time to act in an advisory capacity in regard to stored food insects, and will complete and publish studies already under way that relate to this line of research.

L. O. Howard.

BOY SCOUTS TO HELP.

Mr. J.A.Hyslop of the Bureau of Entomology has made the suggestion that the Boy Scout organization could be used to advantage in reducing the injury by insects, especially in the case of small gardens planted by inexperienced persons who may not become aware of insect attack until it is too late to mitigate it except by the use of some special local organization. He suggests that the Boy Scouts be organized for this work in every locality and that spraying machinery and insecticides be provided for use on call. This plan could be systematized in such a way as to bring about the largest possible use for the machinery provided. The national officers of the Boy Scouts have approved this idea and it has been placed in operation at Hagerstown,Md. where Mr. Hyslop resides. It is believed that this movement will spread widely and that it will be very important in furnishing assistance in cases where it is very greatly needed.

The plans for placing this idea in operation have not been fully developed but the local organizations probably would be made up of a director, treasurer, captains and squads. The function of the director would be to determine the number of scouts available, the number of machines necessary for the work, and to provide immediately for them, to provide an adequate supply of insecticides, to ascertain the necessary charges, and instruct the squads in the methods of application, to direct the squad leaders, and handle the finances. The squad captains would direct the work of the squads, collect the charges and report to the director. They would report each morning to receive the list of gardens to be sprayed during the day, and would see that the machine is returned to the base and properly cleaned and stored in the evening, and would also report the number of plats sprayed, and turn over the funds collected. The squads would consist of eighteen men besides the captain and would be assigned to each machine. Three men and a captain would take charge of the machine for one day each week thereby keeping the machine at work every day.

A further statement on this subject will be included in the next circular.

SPECIAL NEWSPAPER SERVICE.

The Office of Information of the Department of Agriculture has made plans for starting an extensive plate sheet service for distribution throughout the West. This will be begun as soon as the emergency appropriation now being considered by Congress is passed. It will enable the Department to focus the information it has in any threatened section of the country. It will undoubtedly assist greatly in the expeditious dissemination of entomological as well as general information.

SUGGESTIONS FROM STATE AND STATION ENTOMOLOGISTS.

Dr.H.T.Fernald writes as follows: "There is going to be special need in Massachusetts this year, of close local supervision, for literally thousands of people who know nothing about gardens are going to have them this year and they will not even know that insects are at work, in many cases, until it is too late for treatment. Local supervision by agents cooperating with Farm Bureaus in the different counties and in every day touch with the other men of the Bureaus would seem to be the most effective means of accomplishing this last. Unfortunately, most of these bureaus have no one now connected with them who knows anything about the protection side of the work, and they are giving all of their attention to production, and have taken on men for this purpose until their available funds are exhausted.

Prof. E.N.Cory, Maryland, makes the following suggestion: "I might suggest that as there is a possibility that mobilization camps will be established in some of our states (for instance the one to be established in this state on the Susquehanna River) the State Entomologists might be of service to the sanitary engineers of the army in surveying the mosquito and house fly conditions in the respective states and aiding in the control of these pests in the towns in proximity to the mobilization camps. I realize of course that our army officers are fully aware of the gravity of the situation in regard to flies and mosquitoes, but they will be faced with a very different set of conditions than those which they encountered in isolated portions of Texas."

The Director of the Maine Experiment Station has sent copies of the following notes to all newspapers in his state:

DON'T LET INSECTS HARVEST YOUR CROPS.

The coming summer is no time to be generous to the insect enemies of growing food. More important beings than they will be hungry for it.

The Maine Agricultural Experiment Station, through its Department of Entomology, invites the gardeners and farmers of the State to send, for determination, specimens of any insects, found to be attacking crops, concerning which they desire information.

There are two reasons for extra watchfulness this season; the great need for food, and the number of inexperienced growers whose efforts to increase the agricultural products of the country should not be checkmated by insect enemies.

Vigilance is the only safeguard. Suspects can be mailed in stout tin boxes marked with the name of the sender. These should be accompanied by a letter giving information as to what food plants are attacked and the extent of the injury observed.

An insect pest survey and information service has been undertaken by Dr.E.P.Felt, State Entomologist of New York in cooperation with the New York State Food Supply Commission, the State College of Agriculture, the Farm Bureaus and various other Agricultural Agencies. Dr.Felt writes as follows:

"This work is closely coordinated with the Emergency Entomological Service of the Federal Bureau of Entomology. The main purpose is to secure prompt and accurate reports from all sections of the State, to summarize the information thus obtained, distribute it promptly, and thus promote the checking or prevention in large measure of the numerous losses inflicted by insect pests. Particular emphasis is laid upon the initial signs of injury in order that damage may be anticipated and the insects controlled. The project is closely articulated with the control work in the field under the supervision of Messrs. Crosby and Matheson of Cornell University and plans now being developed will make possible an approximation to an entomological patrol. The more important crops receive attention, especially the insect enemies of potatoes, cereal and forage crops, truck and garden crops, and the important fruits. There are approximately one hundred observers reporting weekly and digests of the information with special recommendations in regard to various pests are placed in the hands of county representatives of the New York State Food Supply Commission and field entomologists located in the more important crop sections of the state. Every effort is being made to promote the general adoption of well known and effective preventive or remedial measures."

REPORTS ON INSECT CONDITIONS.

Cereal and Forage Crops.

A severe outbreak of grasshoppers developed in California during the latter half of May, although at the present writing the injury is confined chiefly to grass lands. Mr. T.D.Urbahns reports that he anticipates injury to forage crops a little later when the grasshoppers have become larger and are able to migrate. Reports of injury have been received from the following counties: Humboldt, Glenn, Butte, Colusa, Yuba, Nevada, Contra Costa, Merced, Tulare, Kern, San Diego, Imperial.

Arrangements have been made to enable the Bureau forces to co-operate with the State Extension Service and other State officials in combating the outbreak.

Professor R.A.Cooley reports that grasshoppers are numerous in Western Montana and were hatching on May 14. Steps have been taken to induce the farmers to use the poisoned-bran bait extensively and it is believed that the situation can be kept in hand. The infested region comprises about 350 square miles of territory.

Statements received from Dr.A.W.Morrill and Mr.F.B.Paddock indicate probable injury from grasshoppers in Arizona and Texas.

The chinch bug outlook in general is much more favorable than a month ago. In Northern Texas, where the bugs were becoming very numerous in late April, the outbreak has been practically wiped out, according to a statement dated May 19 received from Professor F.B. Paddock. The situation in both Illinois and Kansas is much more encouraging than a month ago, owing largely to the continued cool weather and abundant rains. In Western Kansas, according to report dated May 19 from Mr.E.O.G.Kelly, chinch bugs are not present in sufficient numbers to cause alarm. Doctor S.A.Forbes in a statement dated May 24 considers the prospect serious enough to make necessary preparation for a campaign of instruction and assistance.

The situation as regards the Hessian fly remains practically unchanged. Quite severe injury is reported in Central Kansas and in parts of Eastern Missouri. The conditions in Southern Illinois continue to be satisfactory and encouraging. Some injury from the Hessian fly has occurred in Central California during the present season.

Ad the result of a recent survey in North Dakota and South Dakota, Mr. C.N.Ainslie reports that the Western grass stem saw fly is very numerous in many parts of those States. In one field examined he found 269 infested stubs in a single square yard of wheat stubble. The insect, apparently, is effectually controlled by parasitic enemies when living in grasses but these parasites do not affect it seriously when it occurs in wheat.

The outbreak of *aphids* affecting barley and other grains in California, reported in last month's letter, has been completely subdued by the work of the lady birds and drier weather conditions.

A repetition of the severe damage to the alfalfa and the clover seed crop of Southern Idaho by *Aphis bakeri* which occurred during the summer of 1916 is forecast by reports received from Professor A.C.Durrill, state entomologist. Mr.George I.Reeves of the Salt Lake City field station is preparing to visit the infested region during the month of June.

The *clover leaf weevil* is considerably more abundant than usual at the present time. This is probably due to the unusually cool weather which has prevailed during the past six weeks. No alarm is felt regarding the presence of the insect as it will probably disappear with the advent of warm, moist conditions.

An extraordinarily severe local outbreak of the *flea beetle* (*Chaetocnema parcepunctata* Crotch) occurred early in May in the vicinity of Yates Center, Kansas, where, as reported by Mr.Kelly, many hundreds of acres of corn were very severely injured by this beetle.

W.R.Walton.

Mr.A.C.Lewis of the Georgia Board of Entomology reported the occurrence of *Sphenophorus callosus* in consuderable numbers in the corn fields of that state.

Mr. J.D.Mitchell reported severe injury to corn in Victoria Co., Texas by cut worms which in several cases destroyed every stalk of corn in fields of from 20 to 40 acres.

Southern Field Crop Insect Investigations.

There has been practically no change in the conditions since the issuance of the last circular. The indications are still that the boll weevil will be found in much smaller numbers than usual except in the extreme southern portion of the infested territory. At Tallulah, Louisiana, up to the end of March eleven weevils had emerged from hibernation cages as compared with eighty-one which had emerged from similar cages during the same period in the preceding year. Up to the middle of May twenty-nine weevils had emerged from hibernation cages as against five hundred and seventeen in 1916. On May 22 extensive field examinations were made in Madison Parish, Louisiana. In the examination of twenty thousand plants only one weevil was found. The only region in which the weevil has been reported in very great numbers is in southern Georgia and northern Florida.

No forecast is possible on the activities of the majority of insects which affect southern field crops. Most of these species, such as the sugar cane borer, the tobacco horn worms, and the rice water weevil

occur with more or less regularity season after season. In general the variation is more local or regional than seasonal, and comparative immunity from injury in one locality is likely to be offset by damage in another.

W.D.Hunter.

Truck Crop Insect Investigations.

The usual number of complaints were made of many injurious insects, but the lateness of the season has interferred with development in most cases but not in all. The following are the most important and interesting:

The following report of cutworms and some other insects injurious in the vicinity of Spreckels, Calif., was received on May 15,1917, from C.J.Stahl.

"I have recently returned from a trip to Stockton, Calif. and vicinity where I had a good chance to see conditions in the beet fields of both the large companies. The cutworm outbreak was found to be as serious as reported. About four acres of beets growing in a field previously planted to grain were entirely destroyed and a larger acreage threatened. The species seems to be Peridroma saucia although the markings are not very plain. It was found that the field was badly in need of water and very little could be expected of the beets unless they were irrigated. I was able to collect specimens of one predaceous beetle, Calosoma cancellatum Esch. which was quite abundant."

"I have never seen aphids in general so abundant as they are this season. Nearly all the beet fields in the San Joaquin Valley are badly infested with a green aphis but do not as yet show any ill effects of the infestation. The natural enemies are abundant everywhere any it may not be necessary to attempt any means of control. A field of potatoes was also found to be heavily infested with a green aphis which was usually found on the upper side of the leaves."

"Several beet fields near Modesto, Calif., were found to be quite badly infested with the beet army worm, Caradrina exigua Hbn. This is the first time that I have seen this species in this part of the state but I am quite sure that it has been present in small numbers. It is quite common in the southern part of the state. It will be necessary to use some methods of control in these fields."

"Only a few leafhoppers (Eutettix tenella) were found and only a few cases of "curly-top" noted but they have appeared in the fields and no doubt will do some damage, especially on the late beets in the vicinity of Modesto."

Cutworms were also reported as doing great damage to tomato plants in Muscatine County, Iowa, by Chas.E.Smith, Scientific Assistant. They were especially abundant where the plants had been set on sandy sod land. Only about one-third of the stand was left in some places. Farmers stated that they knew how to prepare baits but were not doing it on account of the high cost of Paris green.

The false chinch bug (Nysius ericae Schill.) has been reported in the vicinity of Wichita, Kansas, but not in injurious numbers as yet. At Laredo, Texas, it is injurious to cabbage, turnip, and mustard, as well as Chinese cabbage.

Tropical and Subtropical Fruits.

Mr. Woglum reports that slugs are unusually abundant this spring in southern California, and are frequently found infesting various garden crops. Citrud trees grown in close proximity to cover crops have suffered considerable injury. Mr. Woglum is of the opinion that the prevalence of slugs is due to the long continued cool, cloudy, and rainy weather.

The following is a report prepared by Mr.W.W.Yothers on the effects of the freeze of February2 and 3, 1917, on the insect pests and mites on citrus and subtropical plants in Florida.

"It was quite warm in Florida for fully five weeks prior to the freeze, the thermometer often registering 85° F. On Thursday, February 1, the day before the freeze, it was calm and very sultry, the maximum temperature being 86° F. at Orlando. About six o'clock Thursday evening it commenced to rain, and there was more or less precipitation throughout the night. Following the rain there was a strong northwest wind, which continued until Saturday night, the 3rd, when it became calm. The minimum temperature in Orlando for Friday night, Saturday, and Sunday, February 2nd to 4th, inclusive, was 22°F. In the state it ranged from 16° at Jacksonville to 27° at Miami.

The cold wave not only seriously damaged citrus and semitropical trees and shrubs but also reduced the number of insects infesting these plants. Many of the insects were killed outright, while others died from lack of food.

Both the citrus and cloudy-winged white flies received a severe setback as a result of the cold wave, although it is doubtful if the pupae of either species were killed outright by the reduced temperature. In fact, live pupae have been found on plants which did not shed their foliage, such as privet. The white flies, therefore, only survived where plants of this type occurred, or on trees which did not shed all of their leaves. Taking the counties of the state collectively it appears that fully 99% of the white flies were killed either directly or indirectly by the freeze. However, in some counties where the defoliation was not so complete these insects will doubtless be abundant in October or after the third brood has emerged.

Injured leaves full from ten to fifteen days after the freeze and dried up in course of a few days. Owing to the interval between the freeze and the normal period of emergence of the adult white flies the adults of the first brood did not emerge from the pupal cases which were attached to the dead leaves.

The purple scale received a similar setback, many being killed outright, others dying on frozen leaves or injured branches. On February 20th an examination of ten green leaves which had fallen gave the following count: 150 young insects dead and one living female. No living young scales have been observed on new growth in any section of the state except in Pinellas County where the trees were not serioulу injured. For the most part the state is now remarkably free from the purple scale.

As it was impossible to observe the Florida red scale on Citrus the examinations were made on camphor, which did not shed its foliage.

On February 7, four days after the freeze, an extensive examination showed that all stages except the egg had been apparently affected. Subsequent examinations showed that, with exception of the eggs, fully 94 per cent of the insects had been killed. This scale insect also received a setback on privet, one account giving 100 per cent killed.

The avocados in Orlando were killed, although the effect of the freeze on Pulvinaria pyriformis Ckl. has not been absolutely determined. On February 7 many of the scales appeared to be alive, although on the 13th, after the leaves had dried and curled, the insects all appeared dead with one exception. The egg stage was not present at the time of the freeze.

Prior to the cold wave rust mites were unusually abundant for that season of the year. On February 3rd an examination of a tree in an exposed location which was heavily infested on the day before did not reveal a single living mite. A subsequent inspection on February 17th showed them to be very scarce. In the central section of the state the rust mite was not so seriously affected although with proper weather conditions there is little likelihood of much russet fruit this season. Also in Pinellas County rust mites are quite abundant, and will no doubt be present in normal numbers by fall. On the whole it is safe to say that these pests have been considerably reduced, since on May 20th they were scarce in nearly all sections of the state.

Tetranychus sexmaculatus Riley was not as abundant this spring as in former years, and as the result there was little opportunity to determine the effect of the freeze on this pest. Since the freeze a few have appeared but not in alarming numbers. Tetranychus citri McG. did not appear to be affected in any stage, with the possible exception of the egg, which appeared soft and unnatural. Tetranychus yothersi McG. on camphor suffered serious injury, all stages being affected, including the egg. However, in well protected spots the adults and immature stages were not killed.

Aphids on an orange tree before the freeze were dead on the 7th, no eggs being present. However, since the cold wave they have been unusually abundant on young sprouts but were soon killed by parasitic and predaceous enemies."

Insecticides.

An acute situation appears to exist as to the supply of arsenical insecticides in this country. The notably increased interest in gardening and in the better care of orchards, vineyards and other crops has resulted in an unprecedented demand on manufacturers for insecticides, especially Paris green and arsenate of lead. During normal times this extra demand no doubt would easily be met, but the practically complete shutting off of importations of arsenic due to the war has greatly reduced the supply of arsenic and the American sources at the present time are not equal to the needs of the country. Prices for white arsenic, it is reported, have rapidly advanced during the past few months, as from 6 cents per pound in September 1916, to 16 and 18 cents per pound at the present time. The significance of this advance is more readily understood when it is remembered that white arsenic usually sells at quite a low figure, which operates to discourage the development of native

sources of supply. Thus in 1914 the price of white arsenic averaged from 2.9 to 3.6 cents per pound and in 1915 from 2.45 to 2.83 cents per pound at the works.

It is stated by Mr.Frank L.Hess of the Geological Survey, that the output of arsenic in the United States in 1915, the largest in the history of the country, amounted to 5,498 short tons all saved as a byproduct in the smelting of copper, gold and silver ores. During this same year the imports of arsenic compounds for consumption in the United States were 1400 short tons of "white arsenic", 1783 short tons of "arsenic and sulphide of arsenic", or orpiment, and some ten tons of Paris green and London purple.

The principal uses of white arsenic are in glass making, which consumes about one-half of the domestic output, in insecticides, in textile dyeing and in weed killing.

In an effort to learn of the situation as regards arsenical insecticides, letters were addressed to the principal manufacturers throughout the country and responses have been received from most of these. It will be no breach of confidence to reproduce extracts from a few typical communications:

"Your favor of the 3rd instant is before us and regret to advise that we are in exceedinly short supply of all arsenical poisons and have none stored elsewhere."

"In reply beg to advise that we are manufacturers of Paris green, arsenate of lead and bordeaux mixture. Due to the scarcity of arsenic and the high price prevailing for the small quantity available, the insecticide situation is more critical today than at any time during our recollection. The stock in the hands of manufacturers is very light and the outlook for increasing this stock uncertain. * * In regard to arsenate of lead the situation is somewhat similar. Arsenious acid is very scarce and manufacturers who use that material in their process are seriously handicapped."

" * * * The arsenic shortage is so terrific in this country that the price which was formerly three cents per pound, and which was but six cents in September has rapidly advanced to 8¢, 10 and 14 cents until today it is 16 cents per pound. There is not enough arsenic to go around for the normal supply."

"With reference to your inquiry of the 4th regarding our position to take care of serious insect outbreaks, we beg to advise that it seems almost impossible to answer this definitely at the present time. The arsenic situation appears to be a rather grave one for the insecticide manufacturer. It is hard to obtain, only small quantities being quoted and the price is exceedingly high. I do not know the exact reason for this but presume that importations have been cut off, and the largest of these, the Canadian supply, has been very much curtailed. American arsenic does not seem to be in sufficient quantity to meet the demand."

"The very high price of white arsenic, anywhere from 16 to 18 cents per pound for spot goods has seriously curtailed the manufacture of arsenate of lead to that which the manufacture could see a prompt sale for, as to carry over material based on that abnormal price would

certainly not be good business, especially when white arsenic is quoted for August at 11 to 12 cents per pound, and for that reason it is quite likely that the supply this year will not be adequate for any unusual demand."

"Referring to your letter of May 3rd, the garden movement and propaganda for larger crop production has inspired the dealers throughout the country who handle x x arsenate of lead to place unusually large orders and we believe that most of these dealers have a fair stock of our insecticides on hand."

"We maintain stocks of insecticides at all of our warehouses.xxx Unfortunately the extreme demand which has been made upon us during the past few months for insecticidal materials of all kinds has made it impossible for us to accumulate any appreciable stock of these materials in any of our warehouses. We have had difficulty in securing the necessary raw materials to manufacture the abnormal quantities demanded."

Letters from other manufacturing concerns indicate that some of these are in better position as regards the supply on hand of powdered and paste arsenate of lead, and that in addition to meeting demands of their regular trade, they have stored in different parts of the country a fair quantity of their insecticide products. One company states:

> "We are in close touch with all consuming districts and are prepared to rush stock in any section should there be an unusual insect outbreak in any district."

In view of the importance of having available for crop producers at a reasonable price necessary insecticides, especially for use in the case of insect outbreaks, the matter has been referred through Department channels to the Council of National Defense.

Mr. R.S.Woglum, of this Bureau, writes that there is prospect of greater damage than usual from citrus scale insects in southern California. Many orchards were not fumigated last season owing to the scarcity of cyanide, and it is feared that this condition will continue with future serious damage from these insects. From inquiries of importers and manufacturers, it appears that the reason for shortage of cyanide is in part due to the stopping of importation from Germany beginning in 1915, the exhaustion of the stock of this chemical in this country and the stoppage of manufacture of cyanide at Niagara, N.Y., where an important manufacturing plant was located. A new American factory however is being established and it is believed that by the first of June of this year cyanide will be available to meet demands.

The question of possible substitutes for arsenicals is an important one. No other stomach poisons for insects known to us, even measurably answer the requirements so well as arsenical compounds. There are, however, a few substances which are more or less toxic against insects, the use of which in the absence of arsenicals may be warranted. Information concerning some of these has been obtained by Messrs.E.W.Scott and WW S.Abbott in connection with their work for the Insecticide and Fungicide Board.

While Sodium fluoride, on account of its causticity, cannot be used on foliage, it might prove satisfactory as a killing agent in poisoned bran bait for grasshoppers, cutworms, etc. It is of course a standard

treatment for roaches. Calcium fluoride would probably serve the same purpose.

Zinc oxide when thoroughly dusted on plants has much value in the destruction of the larvae of the Colorado potato beetle and is fairly effective against adults of that species. It should be effective if diluted one-half by weight with hydrated or air-slaked lime, or other cheap diluent.

Lead oxide, which is also moderately toxic against some insects, may be used in about the way described for zinc oxide.

Barium carbonate, also has about the same value as the foregoing. It would probably serve as a poisoning agent in bran baits. Barium oxide and barium chloride are also worthy of trial as insect stomach poisons.

Lead chromate has been more or less used as a substitute for arsenicals, especially in portions of Russia and India. It has moderate toxicity and is apparently safe to foliage. The action on foliage of the several other compounds above mentioned has not been fully determined, but it is believed that hardy foliage, such as that of the potato, apple, etc. would not be injured by them.

A.L.Quaintance.

Medical and Veterinary Entomology.

The following letter addressed by Doctor Howard to Professor H.W.Kirk, Victoria University College, Wellington, New Zealand, is of interest in this connection:

> "I have yours of the 19th and 21st of April, with the three additional copies of your "Notes on Fly Control in Military Camps", one of them annotated in pen and ink. I will put these into the hands of our men who are doing experimental work.
>
> I do not know just how the entomological work of the military camps of the British contingent is being carried on at present. I know that Austin and Newstead were engaged, for a time at least, as civil attaches, but I am told that, in the absence of any military status, they found it difficult to do effective work. In this country there are many men in the regular medical department of the Army who are well posted about the sanitary aspects of these entomological matters, and I am told that the military encampments at the Mexican border during the past few years have been well cared for in these directions. But to jump almost immediately from a military establishment of one hundred thousand or a little more to the proposed number of two million or more means a tremendous enlargement of the Medical Corps, and therefore the employment of thousands of physicians from civil life in what is known as the Medical Reserve Corps. Practically none of these men have had training in these lines of camp sanitation. I think, therefore, that they will find it necessary to employ all the men in sight who are trained in medical entomology. However, no decision has been made as yet. The present Surgeon General of the Army, Doctor Gorgas, is of course thoroughly familiar with the entomological aspects of great camps, and carried through great pieces of work

in Cuba and Panama where his greatest problems were along entomological lines. He must be, therefore, thoroughly alive to the needs, and I think will call for trained entomologists when the time comes. At the request of the Council of National Defense, I have prepared a statement which will give some idea of the number of trained men in this country. We have quite a large corps in this Bureau, and several of the teachers in the universities have been training men in this direction for several years.

I can readily understand your desire to get into the middle of things, and your experience, as indicated in your "Notes on Fly Control", has been sufficient to give you a high standing. I think that it is fine of you to offer your services to this Government, and I will bear the matter in mind in case a chance should arise. It is a pity that you cannot go over to the continent and join your own troops. Could you not arrange this by correspondence with the medical officers accompanying the New Zealand contingent? I note that the New Zealand Government does not control services abroad and that it hesitates to suggest to the medical military authorities at home that surgeon officers are not experts in all branches of camp sanitation and that a layman might be useful coadjutor. Of course I am not familiar with the red tape that holds out in New Zealand, but it seems to me that if I were in your place I would write to the best man in the medical service of the New Zealand troops."

The general low temperatures have interfered with the development of the house fly throughout the country. The conditions at the present are like those which occur normally about a month earlier. It was not until the last few days of May that the house fly became at all noticeable in the City of Washington.

The Council of National Defense is still considering the plans for the utilization of entomologists in the war. The present plan of the Council provides for a corps of entomologists to be coordinate with the corps of sanitarians. This subject is also being considered by the Chief of Bureau and the Surgeon General of the Army Medical Corps.

A circular dealing with the insects of importance in military operations has been prepared for early printing. It is a revision of Circular 61 of the Secretary's office which was issued for special use on the Mexican border during the past summer. It has been enlarged and changed to include the results of the recent extensive work in the European armies.

A farmers' bulletin by F.C.Bishopp which deals with the control of the screw-worm of the southwest is now in press. This insect is of far greater importance than is generally supposed. In large areas in the southwest its ravages make it practically impossible for ranchmen to rear calves because of the infestation of the mouths and navels. It has been the custom in such regions to maintain the herds by buying yearlings in other districts. The insect is, therefore, one which has a very direct and important bearing on the production of one of the most important articles of

In June all Poland [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]

The general [illegible] temperatures [illegible] with [illegible] [illegible]

The Council of National Defense in [illegible] [illegible] [illegible] for the [illegible] [illegible]

A [illegible] [illegible] with the Council of [illegible] [illegible]

A [illegible] [illegible] [illegible] [illegible] food.

Mr. F.C.Bishopp submits the following statement:

> "The urgent appeals from various sources for increased production have led thousands of people to go into poultry raising for home or market use. These people have either had no experience with poultry or others with limited experience are going into chicken raising more extensively. During this spring there seems to be an unprecedented amount of damage to chickens from the common mite. This has been due in part at least to the ignorance of many of the people concerned. These war conditions have also had the effect of causing much later hatching of poultry than is usually deemed advisable in the South. In fact I find many are contemplating the hatching of chickens up to July 1 in this locality. This will mean heavy losses from chicken lice unless steps are taken to combat them. I dare say the great impetus to poultry raising which has had a marked response in Texas is to show similar results throughout the country."

Apiculture.

As announced in the number of the Entomological Service circular for May 1, the Office of Bee-Culture Investigations has been urging beekeepers to increase honey production. After June 1 it is difficult for a beekeeper materially to modify his plans and the first circularizing campaign,began as soon as war was declared, is now almost completed. It is most unfortunate that the limited facilities of the office would not permit the sending of circulars to beekeepers in all the States. As rapidly as possible, the office is being equipped so that more of the work may be done mechanically and in future campaigns it is expected that much more can be done.

The following indicates the number of circulars sent to the various states and other agencies: Arizona beekeepers, 150; New Jersey beekeepers 2000; New Mexico beekeepers 110; Apiary Inspectors 100; Maryland beekeepers 940; Association officers 110; Extension workers in beekeeping 55; for distribution to County Agents South 17,400; for distribution to County Agents North and West 3000; Honey Crop Reporters, Bureau of Crop Estimates, 9000; North Carolina beekeepers 7300; Illinois Beekeepers' Association members 325; Pennsylvania beekeepers 8000; Philadelphia beekeepers' Association members 175; North Carolina beekeepers' Association members 90; Wisconsin beekeepers 4200; Colorado beekeepers 1550; Michigan beekeepers 5000; Oregon beekeepers 1975; Idaho beekeepers 650; Washington beekeepers 2275; Manufacturers and dealers in supplies 350; Illinois beekeepers 8350; Indiana beekeepers 7200; Ohio beekeepers 8000.

In addition, over 30,000 circulars have been mailed either in conjunction with the above or with general correspondence. Some of these circulars were two or three pages, making a total of over 175,000 impressions in about six weeks time. Circulars have also been sent by representatives of the office to beekeepers in Tennessee and Massachusetts.

Mention should also be made of the thousands of circulars sent out by state workers, especially in Minnesota and Iowa, and by officers of beekeepers associations and by dealers in supplies. Three press notices have been issued from the Bureau and numerous similar press

notices have been issued by state officials. The bee-journals have cooperated in a most pleasing manner in this effort. It may therefore be assumed that, while the office of Bee-Culture Investigations has been unable to send as many circulars as was desired, there are few if any beekeepers in the United States who do not already know of the desirability of increasing the honey crop this year. The interest manifested by beekeepers is indicated by the fact that the incoming mail for May exceeded that of any previous eight months in the history of the office.

The work of increasing the honey crop will now be continued along somewhat different lines because of the advancing season.

E.F.Phillips.

STATE REPORTS.

FLORIDA.

The following forecast of probable insect injury in Florida has been prepared by Doctor E.W.Berger and Mr.C.E.Wilson with the approval of Mr.Wilmon Newell, Plant Commissioner.

Citrus Insects.

White flies- Spring, summer, fall. Controlled by fungi in summer; contact insecticides rest of the time.
Cottony cushion scale- Twelve months. Controlled by Vedalia furnished by State Plant Board.
Thrips - During blooming period.
Mealybug - Late summer and fall.
Plant-bugs - Fall and early winter.
Rust Mite - Dry periods, fall and spring.
Red Spiders - Same time as rust mite.

Miscellaneous Insects.

Diabrotica 12-punctata - Corn, April and May; satsuma oranges in West Florida December, 1916.
Chloridea obsoleta - Bean pods and tomato, spring; ears of corn summer and fall.
Red Spiders - Beans, April, May, and fall.
Leafhoppers- Beans, April, May, and fall.
Cowpea Pod Weevil - Cowpea, August and September.
Aphids - Beets, spring.
Flea Beetle Larvae - Cabbage roots, summer.
Harlequin Cabbage Bug - Cabbage and rutabaga, fall, winter and spring.
Nizara viridula - Okra and collards, summer and fall.
Cabbage aphis - Cabbage, turnips, etc., spring.
Melon and Cucumber Aphids - Spring.
Laphygma frugiperda - Grass, corn and cowpeas, latter part of August and early September. (Does not occur annually).
Onion Thrips - Onion, spring.
Anticarsia gemmatilis - Velvet beans, cowpeas, August and September.
Cotton Boll Weevil - Cotton, spring, summer and fall.
Proteopteryx deludana - Pecan, latter part of April to June 10th.
Stored grain Insects - Stored grains, all year.

MARYLAND.

Prof. E.N.Cory wrote on May 1, as follows: "I have read your letter carefully and would suggest that from appearances the clover weevil may be abundant this season. Last season severe injury was done in sections of Montgomery County. While we have no sod over two years old, we are finding an abundance at this time."

MISSISSIPPI.

Prof. R.W.Harned, wrote as follows on May 12, 1917.

"We are receiving complaints in regard to injury caused by the corn stalk beetle, Ligyrus rugiceps. These insects seem to be seriously injuring young corn especially in the southwestern part of Mississippi. This is one of the pests that we have with us every year, but I do not believe that it is any more abundant this year than it has been during certain previous years. I might add that although this insect sometimes does serious damage in all parts of Mississippi it always seems to be more serious in the counties in the southwestern corner of the state.

At the present time we are receiving complaints in regard to the wood boring beetles that are attacking pecan trees in this state. Many complaints have come to this office in regard to the beetles that are supposed to be killing pecan trees. In the majority of cases I feel confident that the trees were winter killed and that the beetles that are attacking them are species that are attracted to dead and dying trees.

The Argentine ant is a pest of increasing importance in this state about which we receive frequent complaints."

MASSACHUSETTS.

Dr.H.T.Fernald made the following report on May 9.

"The season here is nearly two weeks behind. Pear and plum blossoms are just beginning to show a faint trace of white. The tops of the elm trees have a tinge of green,this coming from the swelling of the blossom buds. Lilac buds are beginning to show considerable green. The weather has been cold, raw, and rather wet, and there have been but four pleasant days on which one could be safely out without an overcoat for a month past.

Very few insects have made their appearance as yet, but I anticipate that spring will come rapidly once the weather turns warm. Little seeding has been done as yet in the state, owing to the weather, but extensive preparations have been made and an unusually large acreage, particularly in the form of gardens, is evident. Farmers will not as a rule plant much more than last year for lack of help, according to present indications.

Under the above conditions there is little to be reported thus far. Plant lice eggs appear to be very abundant on fruit trees. Tent caterpillar eggs are now hatching, but they are quite scarce as compared with former years, an extended search over a territory which last year produced 319 eggclusters giving only six. Many of the eggs appear not to hatch, and with many which do, the larvae appear to die shortly after."

TEXAS.

The Texas Department of Agriculture has sent a circular to all of its field men asking cooperation with the Bureau of Entomology by reporting all insect depredations. A special form referring to specimens,number,host, collector, damage,date,locality,address,remarks,has been distributed.

MISCELLANEOUS.

How late is the season?

Phenological records at Washington, D.C., Falls Church, Va., and Kanawha Station, W.Va., in 1915 and 1916 showed that, on the average, 1916 was about 10 days later than 1915. Records for 1917 at Washington up to May 1st showed that, on the average, the season was then about 5 days earlier than 1916, while at Kanawha Station, W.Va., on May 4 it was about the same or a little later than in 1917. Then followed the long cold and cloudy period to May 18 which at Kanawha Station set the season back about 10 days which was maintained to the last of the month.

Farmers and others who have kept no records insist that the present season is two to three weeks later than last

Effects of the Late Season on the May Beetles.

Last season the May beetles were flying about May 5th and so abundant at Kanawha Station, W.Va., that many oak and persimmon trees were completely defoliated soon after the leaves unfolded. This season they began to come out at the same locality on May 14th and by the 17th were becoming common, but the continued cool nights together with other possible causes prevented them from doing any perceptible damage to the foliage of trees and shrubs, and at no time - even during the warmer evenings - have they been anything like as common as at almost any evening last year during the general flight which ended about the first of June.

A.D.Hopkins.

LATEST INFORMATION.

Mr.C.W.Creel wrote as follows on May 26:

"Mr.Treherne informs me that we will have to be on the lookout for the wheat midge, *Diplosis tritici*, which has been introduced in the Fraser Valley of British Columbia, and which is now gradually spreading down into Northern Washington. He tells me that the insect has practically made the growing of spring wheat impossible in southern British Columbia. I had no idea that the insect was established in the Pacific northwest, and will have Mr.Lane investigate the extent of the infestation on our side of the boundary when he makes a trip to the Puget Sound country next month. I have been planning to have him go up there to get a line on the distribution of the Hessian fly in the State of Washington, and he can look into this wheat midge infestation at the same time."